

October 2004

# BCO Newsletter

## Bioenergy - Climate Protection - Oil Reduction

### Environmental and Energy Study Institute

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### IN THIS EDITION:

#### COMMENTARY

- [The Potential of the Bio-Based Sector to Revitalize Farming & Rural Communities by Jim Kleinschmit](#)

#### FEATURE ARTICLE

- [A Hydrogen Economy? A Carbohydrate Economy? A Methanol Economy?](#)
- [Study Finds Farmers Support Renewable Energy Standards](#)
- [State DOT Agencies' Experiences with Biodiesel](#)

#### LEGISLATIVE/ADMINISTRATIVE UPDATES

- [Corporate Tax Bill Passes House and Senate, Awaiting Presidential Signature](#)
- [State Renewable Portfolio Standard Updates](#)
- [19 States Have Now Banned MTBE](#)
- [California Air Resources Board Passes Greenhouse Gas Rule](#)
- [FY 2005 Agriculture Appropriations Update](#)
- [167 USDA Sec. 9006 Renewable Energy and Energy Efficiency Grants in 26 States](#)

**URGENT: USDA 30-DAY COMMENT PERIOD TO NOV. 4 FOR PROPOSED RULE ON SECTION 9006!!**

#### RECENT STUDIES

- [Unraveling the Structure of Plant Life – To Make Sustainable Fuels and Chemicals](#)
- [Energy Information Administration Reports Growth in Biomass Energy Consumption](#)

#### NEWS BRIEFS

#### UPCOMING EVENTS

**NOTABLE QUOTABLES**

**COMMENTARY**

**CULTIVATING A NEW RURAL ECONOMY**

**The Potential of the Bio-Based Sector to Revitalize Farming & Rural Communities**

Jim Kleinschmit, Institute for Agriculture and Trade Policy, Minneapolis, Minnesota

While much has been made of the societal benefits of a bio-based economy that increases our energy independence, it is our farmers and rural communities that may be the primary benefactors. We at the Institute for Agriculture and Trade Policy see bio-based production as perhaps having the greatest potential for revitalizing rural America, and are actively working to develop the networks and promote the policies that can make this vision a reality.

Early in our country's history, agriculture and forestry provided the capital and motivation for expanding our infrastructure and boundaries, the food for a burgeoning population, and much of the power for our growing manufacturing sector. With the advent of the new bio-based economy, we have the opportunity to turn once again to farms and rural communities for a significant portion of the renewable resources that we need to feed, fuel and run the industries of the nation. For farm communities, which have been in decline for much of the last 50 years, this "new" approach could provide the spark long needed to revitalize the rural economy and agricultural sector by providing new and diversified cropping and income opportunities.

The primary benefit that the bio-based economy provides farmers and rural communities is a growing market for multiple agricultural crops and farm products. The main commodity crops of the Midwest landscape, corn and soybeans, have traditionally gone to low-value uses such as animal feed. We typically export up to 1/3 of these crops as raw commodities, not receiving any value-added processing benefit. But they are now increasingly utilized for fuel, materials, and other bio-based applications.

The bio-based market has also increased demand for alternative farm crops and products. This new diversification is critical for farmland that is suffering from decreasing soil quality, etc, due to intensive corn/soybean production. For the bio-based market, farmers are being asked to grow crops suited for high oil production (hazelnuts), perennial grasses that produce high amounts of biomass (switchgrass), and plants from which cosmetics and essential oils may be derived (lavender). Many of these crops provide more ground cover, better root structure, and reduced erosion compared to traditional row crops like corn and soybeans.

Growing multiple crops for multiple markets will enable farmers to diversify both their farms and their income streams. The diversity of crops helps mitigate risk for the farmer from both an environmental and economic perspective, as more crops in a rotation can inhibit pest and disease problems, while production of multiple farm products reduces the potential for crop failure or low prices impacting overall farm profitability.

With new crops and products comes new processing and manufacturing needs for rural communities, reversing years of reduced economic opportunity and corresponding population flight. As much of the demand for bio-based products is driven by concern for the environment, farmers are increasingly being rewarded for managing their land in specific ways, so they are not only producing crops, but also providing environmental services such as wildlife habitat, cleaner water, biodiversity and open spaces. This transition results in more resilient and sustainable working landscapes.

To achieve such multiple results, however, requires more than just a successful bio-based industrial sector. For farmers, rural citizens and the environment to benefit, supportive state and federal policies must promote the community and environmental aspects as well as economic goals. Some policies that should be adopted include:

**Bio-based Procurement Standards** – The seed of a new industry can be created simply by government agencies placing a preference on these products. The U.S. government is in the process of implementing a federal bio-based procurement standard, which, if implemented successfully, should help to significantly broaden the bio-based market, and reduce the financial risk of introducing these products. States and local governmental entities should follow the federal government's lead in giving preference to bio-based products.

**Tax and Incentive Programs** – Building the bio-based sector in a sustainable manner will require incentives that are rooted in rural communities. An industry has a much greater chance of succeeding – as well as providing sustainable rural economic development – if policies promote companies that are competitive, flexible, and locally owned. Programs like the Minnesota ethanol program, which favor smaller, farmer-owned facilities, is one example of how governments can incentivize development in order to achieve multiple goals.

**More Funding for Biomass Crop Research** – While corn and soybeans have many bioindustrial uses, there are other crops that hold great promise and need to be evaluated. More funding and research is needed to look at alternate crops and to help speed their introduction on the land and use in the factories.

**More Stewardship Incentives** – Programs like the Conservation Security Program that provide payments for sound environmental management can help farmers to transition to new cropping systems and production methods. Such programs that reward sound management need to be broadened and supported if we want to return diversity to the landscape and farmers' pocketbooks.

America initially prospered as a nation based on its agricultural and natural resource production. That can happen again. For farmers and rural communities, which have long been depressed, the emerging bio-based sector offers new markets and value-added opportunities that can help revitalize the countryside. Whether its bio-based fuels, plastics, building materials or textiles, a new economy can be developed that is based on clean, renewable resources.

Bio-based agriculture has strong support from both farmers and environmentalists. A great opportunity exists to develop policies and strategies that produce a "big tent" of support for bio-based products and sustainable agricultural production. But there is much to be done. It will require strong broad-based support to achieve community, environmental, and economic goals. We at IATP are dedicated to promoting bio-based agriculture and look forward to working with the various stakeholders. We are coordinating the Bioindustrial Development Partnership, a cross sectoral group dedicated to promoting sustainable bio-based development and will be releasing a report on the potential for bio-based production in Minnesota in the coming months. For more information about these and other IATP bio-based efforts, see <http://www.iatp.org>

*EESI welcomes your comments regarding this guest commentary. Please let us know if you would like to submit a commentary for a future BCO.*

### **Feature Article**

#### **A Hydrogen Economy? A Carbohydrate Economy? A Methanol Economy?**

These have all been proposed as potential replacements for our current reliance on fossil fuels. The Administration does appear to be enamored with hydrogen as a future fuel source, though it offers little cost benefit and may actually increase current CO<sub>2</sub> emissions depending on the feedstock source.

A recent paper released by Dr. David Doty<sup>1</sup>, outlines numerous reasons reliance on hydrogen, particularly for light duty vehicles, will be cost prohibitive for the next few decades. His argument is that hydrogen is extremely expensive, is currently being produced from fossil fuels, is stored through compression by fossil fuels, and is transported by fossil fuels with every step in the process continuing to release CO<sub>2</sub> to the atmosphere. Dr. Doty calculates the fuel cost for liquid hydrogen to be roughly \$5/kilogram and the price for pressurized hydrogen could reach \$100/kg, assuming natural gas will remain roughly \$5/GJ. Unfortunately, predictions for the next 15 years indicate natural gas prices might be closer to \$14/GJ causing commercial prices of hydrogen to balloon four times higher. Fuel storage of hydrogen is a great concern as well. Current technology of 'low-cost compressed gas cylinders' only store 1.5 percent H<sub>2</sub> by mass while a \$15,000 carbon-fiber fuel tank still only stores 11 percent H<sub>2</sub>. In Doty's own words, "the risks associated with carrying this mechanical bomb around are probably two orders of magnitude greater than we are accustomed to accepting in our gasoline-powered cars today."

Certainly, current hydrogen production technology does not offer a real solution for the U.S. dependence on foreign oil, but some recent innovations might. There are now laboratories around the world exploring the possibility of producing hydrogen for fuel cells directly from biofuels. The University of Minnesota's Department of Chemical Engineering and Material Science has developed a

technique to produce hydrogen directly from ethanol and water. Their process involves spraying tiny droplets of ethanol mixed with water across a Rhodium-Ceria catalyst where it is rapidly heated to 1500 degrees Fahrenheit. All of the hydrogen from the ethanol and some from the water is extracted. Researchers see an immediate use for this technology for stationary fuel cells in remote areas with a real potential that ethanol derived hydrogen could fuel cars as well. According to Lanny Schmidt of the Univ. of Minnesota research team, "We can potentially capture 50 percent of the energy stored in sugar (from corn), whereas converting the sugar to ethanol and then burning the ethanol in a car would harvest only 20 percent of the energy in sugar."<sup>2</sup>

On the other side of the Atlantic in Great Britain, a research team at the University of Leeds has developed a method to produce hydrogen from sunflower oil. Though this process is prohibitively expensive at present, it would offer a renewable source of hydrogen and effective carbon sequestration through the planting of additional sunflowers. This technology would solve the issue of storing hydrogen, as the energy would be transported as the more stable bio-oil and then extracted when needed to power the fuel cell. Their technique requires a nickel and carbon-based catalyst to aid in releasing the hydrogen from the bio-oil.<sup>3</sup>

Whatever the outcome of the race to replace fossil fuels, a significant production of biofuels will be in order. Though a 'Hydrogen Economy' may sound attractive on paper, the technology's heavy reliance on fossil fuels does not make it a viable option at present. Should biofuels become more economically efficient for the production of hydrogen, perhaps the idea of a hydrogen economy would become more acceptable. Regardless of the debate over the feasibility of hydrogen, a significant shift from carbon emitting energy sources to alternative sources of energy needs to be adopted swiftly. As Dr. Doty concludes in his paper, why focus on a technology that is decades away from being commercially available when, "Cellulosic bio-ethanol (from poplars and switchgrass) could be economically competitive within six years."<sup>1</sup>

<sup>1</sup> Doty, David F, PhD. *Practical, Clean Energy for Future Transportation*. Doty Scientific, Inc. Columbia, SC. March 20, 2004

<sup>2</sup> Deluga, Gregg. *From Fields to Fuel...To Fuel Cells: Ethanol's Role in the Hydrogen Economy*. *Ethanol Today*. August 2004

<sup>3</sup> Black, Richard. *Sunflower Oil Boost to Car Future*. *BBC News*. August 26, 2004

### Study Finds Farmers Support Renewable Energy Standards

According to a study released by Harvesting Clean Energy, national and regional farm organizations are joining forces in support of renewable energy standards. In the words of Patrick Mazza of Harvesting Clean Energy, the reason a number of farm organizations are supporting renewable energy standards is they feel it is "one of the most powerful tools to build markets for biofuels, wind power, and other agriculturally produced clean energy sources."<sup>1</sup> Reducing reliance from fossil fuels and petroleum fertilizer inputs would significantly improve rural economic stability. In 2003 alone, prices for fertilizer have increased by one-third causing an average farmer to pay \$10-15 more per acre. High natural gas prices have caused the closure of 21 percent of U.S. ammonia plants producing nitrogen fertilizer. A significant change in federal energy subsidies will have to be achieved if a successful shift to 20 percent of U.S. energy supply from renewables is to occur. In 2001, the EIA estimated federal support of renewables to be \$1.3 billion annually, while oil and gas received \$11 billion and coal received \$3.3 billion annually in subsidies.

Currently the concept of a renewable energy standard has been separated into two fronts: a renewable fuel standard (RFS) and a renewable portfolio standard (RPS), both of which contain real benefits for the country's agricultural sector. An RFS that increased annual production of biofuels to 5 billion gallons by 2012 would have a significant impact on rural economics and the already fast-growing ethanol industry. In John Urbanchuk's analysis, "The Contribution of the Ethanol Industry to the American Economy in 2004", he outlines the fast rise of a ethanol's 1980 'cottage industry' with annual production of 175 million gallons to today's 74 ethanol manufacturing facilities producing over 3.1 billion gallons per year. The 25 percent increase in ethanol production from 2003 to 2004 will require \$4.6 billion in purchases, adding roughly \$8.9 billion to 2004 U.S. gross domestic product. The American Farm Bureau Federation (AFBF), one of the farm groups supporting an RFS, has stated it would stimulate the rural economy through \$5.3 billion in rural capital investment and 214,000 new jobs. An RFS would successfully increase annual farm income by \$4.5 billion and add \$51 billion to new farm income by 2012. It would decrease the trade deficit by \$34 billion and lower federal crop support by \$5.9 billion by 2012.<sup>1</sup>

This study found that an RFS on the regional scale has tangible economic benefits. For instance a plant that produces 40 million gallons per year generates \$142 million locally from construction costs and employment as well as annually purchasing \$56 million in goods and services from local suppliers. During operation of the plant, 71 percent of its purchases is grain from farmers. A directly visible economic benefit to farmers can be seen within a 50-mile radius of a corn-ethanol plant, where crop prices are generally 5-10 cents higher per bushel.

National and regional farm groups are also vigorously supporting a Renewable Electricity Standard (or a Renewable Portfolio Standard). So far 17 states have adopted RPS's. As a direct result of these policies, these states have encouraged two-thirds of the wind development occurring between 1998 and 2003, according to the Union of Concerned Scientists. These clean energy initiatives have been reaping huge economic benefits for rural economies. A landowner leasing up to a half acre of land per turbine receives 2-3 percent of gross revenue (approx. \$2,500-4,000 per turbine). For the local community every "100 megawatts of wind capacity creates 200 construction jobs, 2-5 permanent jobs, and up to \$1 million in local property tax revenue."<sup>1</sup> UCS finds an RPS of 20 percent by 2020 would induce \$75 billion in new capital investment, \$4.7 billion in property tax revenues for rural areas, and \$975 million in lease payments to landowners for wind power. Thus it is no surprise state farm groups in Colorado, Idaho, South Dakota, and North Dakota have been firm supporters of at least a state-wide RPS. The North Dakota Farm Bureau in 2002 called for the state to plan to install 10,000 megawatts of wind capacity by 2020. They cited benefits of up to \$6 billion for construction, \$23 million annually for landowner payments, and \$59 million going to local economies for operation and maintenance of the wind farms.

<sup>1</sup> Mazza, Patrick. "Farm Groups Pushing for Renewable Energy Standards" *Harvesting Clean Energy Issue Brief* August 2004

### State DOT Agencies' Experiences with Biodiesel

A collaborative research effort recently released at the 2004 joint American Society of Agricultural Engineers (ASAE) and Canadian Society of Agricultural Engineers (CSAE) Annual International Meeting produced an overview of state Department of Transportation agencies' impressions on biodiesel use in agency vehicles. The research effort was supported by the South Dakota Department of Transportation (DOT) and involved analysis of completed surveys from 48 of the 50 State DOT's.

SDDOT initiated this research project to collect information on previous experience state DOT agencies' operations have had with biodiesel. According to 18 states surveyed, the primary feedstock for biodiesel is soy methyl ester with none reporting use of biodiesel from rapeseed. Soybeans are the leading agricultural product for South Dakota with 22 percent being processed within the state. Between 1996 and 2000, 14.7 percent of South Dakota's agricultural cash receipts for livestock, crop production, and government payments were accounted to soybeans.<sup>2</sup>

A total of 21 states have considered and are testing or using a biodiesel blend in agency vehicles. Nine responded that they were under some form of statewide mandate, which was either in the process of being considered or had been enacted previously. Five states reported having a formal mandate either requiring use of a biodiesel blend presently or in the near future. Only Minnesota has enacted a statewide general use mandate requiring all diesel sold to contain 2 percent biodiesel. This will go into effect when annual consumption of biodiesel exceeds 2 million gallons; current consumption is 397,000 gallons.

North Carolina has reported consuming the most biodiesel without a state mandate; NCDOT has utilized 3.1 million gallons. Kansas's DOT is consuming the second largest amount of biodiesel, roughly 2 million gallons. It enacted a mandate in the summer of 2003, requiring all state agencies to use a B2 blended fuel as long as the price differential with conventional petroleum diesel fuel did not exceed \$.10.

Seventeen states reported not having any experience with biodiesel, while 14 states surveyed admitted considering biodiesel but decided against using it. The most common reasons given for not adopting biodiesel use were: high fuel cost, behavior in cold weather, issues around storage and infrastructure, NOx emissions, performance and quality concerns, or engine warranty.

B20 was the most common biodiesel blend being utilized, preferred by 14 of the 19 states utilizing blended fuels. Minnesota and Kansas are using a B2 blend, while a few states have used B10 (Delaware) and B5 (South Dakota) blends.

This study concluded that though state mandates were often the impetus for adoption of blended fuels in agency vehicles, over half of the 19 states using biodiesel said they were not required to. Of the 17 states that responded to the Maintenance and Performance Issues section of the survey, only 8 reported any fuel filter plugging problems. All of these states noted that the problems were resolved once filters were replaced.

<sup>1</sup> Humburg, D et. al. 2004 *Biodiesel Use and Experiences among State DOT Agencies*. ASAE/CSAE Meeting Paper no. 046072. St. Joseph, Michigan



### **Legislative/Administrative Updates**

#### Corporate Tax Bill Passes House and Senate, Awaiting Presidential Signature

On Monday, October 11, 2004, the Senate passed by a vote of 69 to 17 the *American Jobs Creation Act of 2004* (HR. 4520). What emerged as a \$140 billion bill started out as a quite modest bill to repeal subsidies ruled illegal by the World Trade Organization (WTO). The WTO levied progressive sanctions on U.S. exports that increased 1 percent per month set to reach 13 percent in November.

Within the 650 page conference report there are a number of tax credits for renewable electric generation as well as tax credits for biodiesel and ethanol fuel production. Though the current legislation is **far** from ideal, it does mark a recognition by Congress of the importance of supporting the development of viable commercial renewable energy. However it may well be difficult for these technologies to be competitive with more conventional energy sources as significant subsidies for coal, oil, and natural gas were maintained—if not increased—as well.

The conference report saw the adoption of some of the Senate energy title language, expanding the definition of qualifying energy resources from wind and closed-loop biomass, to geothermal, open-loop biomass, solar, small irrigation hydroelectric, municipal solid waste, and refined coal. Some important solar provisions, for example, were left out.

The renewable tax credit indexed for inflation would be 1.8 cents/kilowatt hour. This level was maintained for wind, solar, closed-loop biomass and geothermal but halved for open-loop biomass, small irrigation hydroelectric, and municipal solid waste to .9 cents/kilowatt hour.

The language of the bill significantly limits the number of electric projects that will qualify by specifying only facilities that come on line between the enactment of this bill and January 1, 2006 will qualify for a 5-year tax credit term (including geothermal, open-loop biomass, solar, small irrigation hydroelectric, and municipal solid waste). Wind and closed-loop biomass are an exception as the credit extender applies to projects started after 1992, for closed-loop biomass, and after 1993, for wind, and which come on line by January 1, 2006, with credits provided to projects for a 10-year term. With this small window of time for the development of renewable electric projects, it is difficult to imagine how many *new* projects, if any in some technologies, will actually qualify for a production tax credit. Because the credit expires the end of 2005, it means that next year there will have to be another fight to extend the credits for renewable energy.

It is interesting to note that refined coal, defined by a proven reduction in emissions of 20 percent NO<sub>x</sub> and either a reduction in SO<sub>x</sub> or mercury emissions (not necessarily both), will be awarded \$4.375 per ton (indexed for inflation) for a ten year term that will apply to facilities that begin operating after enactment of this bill until **January 1, 2009**—a very different treatment from renewable projects.

This bill also amends and extends the alternative fuel excise tax credits. The Volumetric Ethanol Excise Tax Credit (VEETC) changes existing law so that, effective September 30, 2004, the excise tax credit for ethanol will not result in any loss of funds to the Highway Trust Fund, but will instead be offset through the Treasury. This has been a bone of contention for many state departments of transportation. Upon enactment of this bill the Treasury will be responsible for awarding 51 cents/gallon of alcohol (ethanol) mixed with gasoline, 60 cents/gallon of alcohol (excluding ethanol) mixed with gasoline, 50 cents/gallon of biodiesel mixed with traditional diesel, and \$1.00/gallon of agri-biodiesel mixed with traditional biodiesel. The definition of agri-biodiesel is biodiesel produced from virgin vegetable oils derived from corn, soybeans, sunflower seeds, canola, cottonseeds, crambe, rapeseeds, safflowers, flaxseeds, rice bran, and mustard seeds, as well as from animal fats.

The tax credit is applicable to the producer of the biodiesel and alcohol fuel mixture for fuel sold after December 31, 2004. In the case of ethanol it will terminate after December 31, 2010 and in the case of biodiesel will terminate after December 31, 2006.

Petroleum-based fuel tax credits included 5 cents/gallon of low sulfur diesel fuel (“diesel fuel with a sulfur content of 15 parts per million or less”) for small business refiners as well as significant tax credits for oil and natural gas produced from marginal wells. The credit amount is \$3 per barrel of crude oil produced and 50 cents per 1,000 cubic feet of qualified natural gas. This bill is awaiting the signature of the President, which is expected to occur in the near future.

*\*\*Full text of the Conference report can be found at <http://waysandmeans.house.gov>*

### State Renewable Portfolio Standard Updates

It appears **Colorado** will be the first state to put a renewable energy portfolio standard up for a public vote. Through the work of *Coloradans for Renewable Energy*, double the requisite signatures were submitted to put the option of an RPS on the Nov. 2 ballot this year. Today, only two percent of the state's energy is produced from renewable energy technologies while this mandate would require ten percent of Colorado's energy to be produced from wind, solar, geothermal, biomass, small hydropower, and hydrogen fuel cells by 2015.

This form of legislation has been stalled a number of times in the state's legislature, but advocates are optimistic that voters will show overwhelming support for the initiative. A poll completed three months ago showed 70 percent of voters were in favor of implementing an RPS. This legislation is less popular with the seven large power companies that would fall under this mandate. For instance, Xcel Energy Inc. argues that this mandate would increase generation costs by anywhere from \$580 million to \$1.6 billion, with industrial and commercial energy consumers shouldering the bulk of it.

On September 22 the **New York** State Public Service Commission accepted Gov. Pataki's RPS plan. The approved standard starting Jan. 1, 2006, mandates that 25 percent of electricity produced be from renewable sources by 2013; this would be the most aggressive standard adopted so far. The PSC, modifying Pataki's original plan, did specify that direct incineration of municipal solid waste (MSW) would not be included in the RPS. However, the PSC does recognize the extraction of biomass fuel from MSW as a renewable energy stream and one consistent with the RPS. It is expected that 60 percent of the mandated renewable capacity would be provided by wind. By 2013, the PSC projects New York's wind capacity to grow from the current 48 megawatts to 2,400 megawatts and an overall addition of 3,700 megawatts of renewable capacity.

Environmental groups in New York are overjoyed by this mandate, second in the country only to California's. They predict many improvements in air quality, including; a 7.7 percent cut in carbon dioxide emissions, a 6.8 percent reduction in nitrogen oxide, and a 5.9 percent reduction in sulfur dioxide. The New York State Energy Research and Development Authority (NYSERDA) will begin establishing contracts for renewable energy procurement from power companies in 2006 and will purchase enough power to reach the 24 percent target by 2013. The final one percent will be accomplished through the voluntary purchase of green power credits by energy consumers.

### 19 States Have Now Banned MTBE

Methyl tertiary-butyl ether (MTBE), a gasoline additive ruled a possible carcinogen and groundwater pollutant by the Environmental Protection Agency, may not have a federal ban on it yet but several states have implemented their own legislation against its use. New Hampshire has officially become the 19<sup>th</sup> state to impose a ban on the use of MTBE, effective by 2007. States that have already passed legislation against the additive include: Colorado, Iowa, Michigan, Minnesota, Nebraska, South Dakota, Washington, Connecticut, California, New York, Arizona, Kansas, Indiana, Illinois, Missouri, Ohio, Kentucky, and Maine. This ban comes on the heels of a suit New Hampshire brought against a number of oil companies accused of releasing MTBE into the state's water supply.

### California Air Resources Board Passes Greenhouse Gas Rule

After what some have called a 'marathon public hearing' on September 24, 2004, the California Air Resources Board (CARB) approved a rule that would mandate automakers to manufacture vehicles with reduced greenhouse gas emissions by model year 2009. The original legislation enacted by the California legislature was authored by Assemblywoman Fran Pavley (D-Agoura Hills). This rule will affect pickup trucks, SUV's, and new passenger cars and will elicit average vehicle emissions reductions of 22 percent by 2012 and 30 percent by 2016. This rule will have very significant impacts on the auto industry, especially if the seven other states (New York, Massachusetts, New Jersey, Vermont, Connecticut, Rhode Island, and Maine) and Canada, which have indicated interest in adopting California's vehicle emission standards, thereby tripling the number of cars required to comply.

**FY 2005 Agriculture Appropriations Update**

On September 14, 2004 FY05 Agriculture Appropriations bill was reported out of the Senate Appropriations Committee. A number of cuts were made while some funds were restored to critical energy title programs authorized by the 2002 farm bill.

**Section 9002: Federal Procurement of Biobased Products:**

	<b>Administration</b>	<b>House</b>	<b>Senate</b>
<b>FY 05</b>	\$2 million	\$2.969 million	\$2 million

**Section 9004: Biodiesel Fuel Education Program:**

	<b>Administration</b>	<b>House</b>	<b>Senate</b>
<b>FY05</b>	\$1 million	\$1 million	\$1 million <sup>+</sup>

\*mandatory funding of \$1 million/yr. provided in the 2002 farm bill.

**Section 9006: Renewable Energy and Energy Efficiency Rural Development Program:**

	<b>Administration</b>	<b>House</b>	<b>Senate</b>
<b>FY05</b>	\$10.77 million	\$23 million	\$20 million

\*mandatory funding of \$23 million/yr.

**Section 9008 Biomass Research and Development Act:**

	<b>Administration</b>	<b>House</b>	<b>Senate</b>
<b>FY05</b>	\$14 million	\$14 million	\$14 million

**Section 9010 CCC Bioenergy Program:**

	<b>Administration</b>	<b>House</b>	<b>Senate</b>
<b>FY05</b>	\$100 million	\$100 million	\$100 million

\*mandatory funding of \$150 million/yr.

**Section 6401: Value-Added Agricultural Product Market Development Grants (VAPG):**

	<b>Administration</b>	<b>House</b>	<b>Senate</b>
<b>FY05</b>	\$15 million	\$15.5 million	\$15 million

\*mandatory funding of \$40 million/yr.

<sup>+</sup>Senator Tom Harkin (D-IA) and Senator Kit Bond (R-MO) did offer a successful amendment to restore funding to USDA's Biodiesel Fuel Education Program, Section 9004 in full committee. Chief Executive Officer Joe Jobe, of the National Biodiesel Board (NBB), was thankful to "Senators Harkin and Bond for their bipartisan recognition that the fledgling biodiesel industry relied on Congress's commitment of funding to help increase awareness and grow the biodiesel industry."

The future of this bill is uncertain. It did not reach the Senate floor before recess and, therefore, is likely to be added to an omnibus funding bill to be voted on during the 'lame-duck' session in mid-November. It is under a Continuing Resolution (CR) until November 25.



167 USDA Sec. 9006 Renewable Energy and Energy Efficiency Grants in 26 States

On September 16 the US Department of Agriculture announced, under its Section 9006 grant program, that applicants from 26 states were awarded \$21 million in renewable energy project grants and \$1.8 million in energy efficiency project grants for FY 2004. This year's number of applicants, **237 applications** submitted for a total of **\$36.6 million** in requested funds, was significantly up from FY 2003 when 148 applications were received.

The Senate FY 2005 Agriculture Appropriations bill was reported by the full Committee September 14, 2004. The Senate provides \$20 million for Section 9006, **\$3 million below** mandatory levels while the House bill provides the full \$23 million authorized in the 2002 farm bill. Final appropriations levels will be determined during a 'lame-duck' session of Congress scheduled to begin Nov. 16.

A breakdown of **Renewable Energy** grant awards by state is shown below:

State	Number of grants	Total of Grants Awarded
California	3	\$448,271
Colorado	1	\$200,060
Delaware	1	\$500,000
Georgia	1	\$249,741
Iowa	5	\$1,532,779
Idaho	2	\$447,060
Illinois	2	\$653,960
Massachusetts	1	\$196,978
Michigan	1	\$203,725
Minnesota	25	\$6,522,387
Missouri	1	\$256,850
Mississippi	3	\$577,904
Nebraska	2	\$648,475
New York	8	\$674,055
Ohio	2	\$445,540
Oregon	1	\$500,000
Pennsylvania	3	\$785,087
Texas	2	\$191,275
Virginia	2	\$350,000
Washington	1	\$175,000
Wisconsin	25	\$5,264,928
Vermont	1	\$175,000
<b>TOTAL</b>	<b>93</b>	<b>\$20,999,075</b>

A breakdown of **Energy Efficiency** grant awards by state is shown below:

<b>State</b>	<b>Number of Grants</b>	<b>Total of Grants Awarded</b>
<b>Alabama</b>	1	\$23,688
<b>Iowa</b>	2	\$19,557
<b>Illinois</b>	1	\$3,063
<b>Kansas</b>	2	\$17,935
<b>Maine</b>	1	\$4,462
<b>Mississippi</b>	39	\$1,272,444
<b>North Dakota</b>	1	\$18,860
<b>Nebraska</b>	13	\$152,410
<b>Oklahoma</b>	10	231,783
<b>Washington</b>	1	\$2,502
<b>Wisconsin</b>	2	\$66,270
<b>TOTAL</b>	<b>73</b>	<b>\$1,812,974</b>

*\*Most of the Energy Efficiency grants were for large- and small-scale building efficiency improvements.*

A breakdown of awarded grants **by Technology** is shown below:

<b>Technology</b>	<b>Number of Grants</b>	<b>Total of Grants Awarded</b>	<b>Number of Applications Submitted</b>
Anaerobic Digesters	37	\$9,508,946	46
Biomass/Bioenergy	13	\$3,136,132	20
Geothermal	2	\$285,353	5
Hybrid	2	\$126,992	2
Solar	2	\$54,822	14
Wind	38	\$7,886,830	53
Energy Efficiency	73	\$1,812,974	97
<b>TOTAL</b>	<b>167</b>	<b>\$22,812,049</b>	<b>237</b>

A complete listing of individual awardees can be found on EESI's website at [www.eesi.org](http://www.eesi.org) or on the USDA web-site at <http://www.rurdev.usda.gov/rd/newsroom/news.htm>.

### **Recent Studies**

#### **Unraveling the Structure of Plant Life – To Make Sustainable Fuels and Chemicals**

The Department of Energy's National Renewable Energy Laboratory (NREL) is involved in an important research effort to reduce the cost of enzymes intrinsic to the hydrolyzation of cellulose for ethanol fuel production. Making cellulosic ethanol a more economically viable option would have huge implications on the U.S. ethanol industry, offering a tremendous expansion to the current ethanol feedstock options. Partnered with NREL under blanket DOE funding are enzyme producers Novozymes and Genecor International.

The core of the project is cellulases, a family of enzymes that work in concert to hydrolyze cellulosic fiber in plant material to sugar. The sugar is then used in chemicals or for ethanol fuel production.

Biomass consists of three carbohydrate components, lignin (15-25%), hemicellulose (23-30%), and cellulose (38-50%). In their study *Unraveling the Structure of Plant Life*, NREL describes the structure of biomass as strands of cellulose, containing hundreds of glucose sugar molecules, wrapped in sheaths of lignin and hemicellulose.

The key to cellulose hydrolyzation is the unraveling of the polysaccharide links of its component sugars. Hemicellulose has proven reasonably simple to hydrolyze and in that process, a portion of the lignin also becomes water soluble. This pretreatment removes the sheath from cellulose and leaves the recalcitrant cellulose exposed for hydrolysis.

Currently cellulose can be effectively hydrolyzed with strong acid and high temperature, but this process remains very expensive and NREL has concluded that enzymatic hydrolysis can be more cost-effective in the long-term. NREL views acid hydrolysis as well-developed with little room for improvement, whereas they view enzymatic hydrolysis as fledgling and believe its complexity may be simplified with further research.

NREL scientists believe lowering the cost of cellulases to produce biofuel to be the most promising domestic alternative to petroleum. Cellulases are also a key element in the biorefinery industry – one that NREL scientists believe capable of producing all of the plastics and other products traditionally associated with petroleum, which NREL hopes will develop in the United States.

The research objective is to lower the cost of enzyme production to 10 cents per gallon of ethanol produced. It is believed that this cost-production ratio will enable the economic competitiveness of cellulose-derived ethanol with traditional fossil fuels.

A key component of the project is the modeling of the interaction of the cellulases with cellulose. Researchers use modeling for fundamental understanding of the interactions between different components in the hydrolyzation of cellulose. To produce the necessary enzymes more cost-effectively, researchers are working to make the enzymes more effective. In this vein, researchers have gone beyond simple genetic manipulation to the creation of enzymes not found in nature and the coercion of organisms to produce these enzymes.

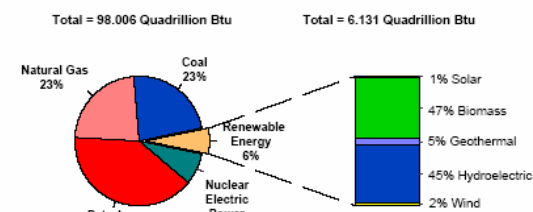
To view a copy of this report please visit: [http://www.nrel.gov/research\\_review/pdfs/36178c.pdf](http://www.nrel.gov/research_review/pdfs/36178c.pdf)

#### **Energy Information Administration Reports Growth in Biomass Energy Consumption**

The Energy Information Administration (EIA) has just released its latest *Renewable Energy Trends 2003*, revealing that consumption of renewable energy had increased by 3 percent with most of it due to growth in hydropower and biomass. The total amount of renewable energy used in 2003 was 6.1 quadrillion Btu (quads), approximately the same level as in 1989. In the 1990s, renewable energy consumption peaked at 7.1 quads, roughly 7.5 percent of U.S. total energy consumption. This energy was produced mainly from large-scale hydropower projects.

The use of biomass for energy has grown a great deal in the transportation and somewhat in the residential sector, while use in the industrial and electric generation sector had decreased by 1 and 2 percent respectively. The significant growth in the transportation sector was due to shifts from use of MTBE to ethanol as a

**Figure 1. The Role of Renewable Energy Consumption in the Nation's Energy Supply, 2003**



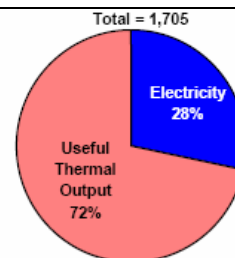
Source: "Renewable Energy Trends 2003",  
Energy Information Administration. July 2004

formulated gasoline oxygenate, causing consumption to increase by 41 percent. Residential consumption of biomass saw a 15 percent growth.

The majority, roughly 60 percent, of renewable energy consumption in 2003 was attributed to the electric power sector. This electricity generation (including combined heat and power) totaled 4.1 quads, with 90 percent ascribed to hydropower and biomass. Overall there was an addition of 560 megawatts of renewable energy capacity for electric generation with biomass responsible for 110 megawatts. Wood biomass for power generation increased 17 percent, while use of wood/wood waste declined by 4 percent.

Biomass provides 95 percent of the renewable energy used in the industrial sector. Of the 1.1 quads of industrial non-electric renewable energy consumption from 'wood', most is from paper mill wood waste product or black liquor. Both residential and commercial biomass use grew 15 percent in 2003. Unlike most other forms of renewable energy, biomass is utilized for thermal production as well as electricity generation (see Fig. 2).

**Figure 2. Industrial Biomass Energy Consumption by End Use, 2002 (Trillion Btu)**



Source: "Renewable Energy Trends 2003",  
Energy Information Administration. July 2004

## News Briefs

### Yorkshire Plant in Britain to Produce Bioelectricity from Rapeseed

Rapeseed, the yellow flower of the *Brassica* genus, similar to Canola, is the subject of a U.K. bioelectricity project. Rapeseed is a popular source of biodiesel in Europe, producing a rich fuel known as rape-methyl-ester (RME). The Yorkshire-based project represents the first commercial bioelectricity project involving Rapeseed. The project is a venture between the Swiss agrochemical company Syngenta, and Springdale Energy. Syngenta supplies seeds to farmers, who in turn have been contracted to sell their rape harvests to Springdale Energy, the operator of the power plant. The project aims to generate one megawatt (MW), or roughly the energy required to power 1,000 homes. The initial crops will cover nearly 10,000 acres in an effort to meet the one MW objective. This venture marks an important step for the United Kingdom to meet its Kyoto Protocol commitments requiring 5 percent of the nation's electricity to come from renewable energy sources by 2010.

### DaimlerChrysler Initiative Exploring Biodiesel Potential of Jatropha

DaimlerChrysler is nearing the end of its inaugural year in a five year public-private partnership to explore the biodiesel potential of the bushy perennial, Jatropha. Project partners include the United Nations Environmental Program, the German University of Hohenheim and the Indian Central Salt & Marine Chemicals Research Institute. The project is based in India, a country for which the project has significant ramifications. Currently India imports all of its petroleum, and its transportation sector utilizes diesel to power the majority of its fleet. The nation's air quality is so poor and the country's incidence of respiratory ailments so high that New Delhi, India's capital, has banned the use of diesel-powered vehicles. Jatropha's unique ability to grow in harsh, wasteland conditions are an important part of India's hope, as much of the subcontinent is dry and conditions poor for traditional crops. Jatropha helps prevent erosion by both wind and water and could become an important cash crop in a country whose rural population is distressingly poor. Jatropha's oil is also an effective lubricant, and the byproduct of the oil extraction is a rich, organic fertilizer that can improve soil quality. The initial scope of the project is modest, with plantations of 25 and 50 acres, with the 5-year project window of DaimlerChrysler balanced against the 2-5 year maturation of Jatropha seedlings to peak nut production.

In related news, on September 23, 2004, DaimlerChrysler made the statement that this month it would fill the tanks of all its new Jeep Liberty vehicles with five percent biodiesel (B5). In a joint effort with Volkswagen and Choren, DaimlerChrysler is investing in the production of SunDiesel and promoting the production of diesel vehicles for Europe and the United States.

### Arkansas, Soy Keeping You Warm?

U.S. Rep. John Boozman (R-AR) recently toured BioBased Systems, a soy-based spray-foam insulation manufacturer, located in his district in Rogers, Arkansas. This technology, in Boozman's words, would do well for the Arkansas economy considering, "Our

situation is we don't have any problem raising soybeans." Biobased Systems has been coordinating construction efforts with Next Generation Industries whose Steel Systems division recycles scrap steel into building material. They are both actively raising awareness about this non-petroleum-based, spray-foam insulation that they claim can save consumers 30-50 percent on their energy costs. This technology could have a huge economic impact for soybean farmers. BioBased Systems is acquiring soybean inputs to produce their soybean oil from over 600,000 soybean farmers in the United States. Boozman's interest and support of biobased products is evident by his backing a bill offering up to a \$2,000 tax credit for builders or homeowners using non-petroleum based products.

### House Committee Discusses the Effects of High Natural Gas Prices on Agriculture

Rising natural gas prices have had detrimental impacts on a number of economic sectors. The U.S. agriculture sector is no exception with roughly 15 percent of farm income spent on energy, with 8 percent spent on indirect energy costs, such as fertilizer procurement.<sup>1</sup> Fertilizer production is highly dependent on natural gas as a feedstock, and as a direct result of sky rocketing prices the industry has suffered many cutbacks. Approximately 20 percent of U.S. fertilizer production facilities have been forced to shut down causing numerous producers to relocate overseas. The Small Business Subcommittee for Rural Affairs held a hearing on September 22 to discuss the price volatility of natural gas despite, according to Chairman Sam Graves (R-MO), "the United States having an abundance of natural gas." Most of the panel encouraged passage of the stalled energy bill (HR. 6), as well as further development of nuclear and coal power plants to reduce dependence on natural gas for electricity production. Committee members, Rep. Shelley Moore Capito (R-WV) and Rep. Bill Shuster (R-PA) were glad to hear various witnesses urge greater use of coal as that would be an economic boon for their states. Only one witness advocated energy-efficiency and renewable energy technologies as strategies to mitigate high natural gas prices.

The hearing panel included: Rep. Steve King (R-IA) (Co-founder, House Agriculture Energy Users Caucus), Rep. Jon Peterson (R-PA) (Co-chair, House Rural Caucus), Hal Swaney (Missouri Farm Bureau), Brent Rockhold (National Association of Corn Growers, Missouri), Billy Willard (The Fertilizer Institute), Mr. Peter Huntsman (Huntsman LLC, Texas), J. Fletcher Smoak (National Association of Manufacturers), and Bill Prindle (Deputy Director, American Council for an Energy Efficient Economy).

<sup>1</sup>*Congressional Research Service Memorandum*

### Farm Aid 2004 Promotes 100 Percent Biodiesel

Willie Nelson, Farm Aid President, and Neil Young both have been strongly promoting biodiesel and using it to power their tour buses and personal vehicles. This year's Farm Aid, sponsored by *Silk Soymilk*, took place on September 18 at the White River Amphitheater on the Muckleshoot American Indian Reservation near Auburn, Washington. Puget Sound Clean Cities Coalition was optimistic that having the concert so close to Seattle would help with their promotion of alternative fuels.

### USDA Opens 30-Day Comment Period for Renewable and Energy Efficiency Grants

The U.S. Department of Agriculture Section 9006 grant program authorizes \$23 million per year in direct financial assistance for renewable energy and energy efficiency projects in rural America. For future years of this program, the USDA must develop a federal regulation for how it will be administered. On October 5, 2004, USDA published its **proposed** rule for Section 9006 in the Federal Register (<http://www.gpoaccess.gov/fr/>) for a **30-day** public comment period. USDA provides a detailed explanation for the reason they have granted only 30 days instead of 60 for public comment, while providing the opportunity for stakeholders to request an extension of time if necessary.

USDA has outlined a specific list of issues about which it would like to receive comments; in particular, 1) what the effect of the minimum funding level of \$2,500 has on potential projects, 2) whether it would be appropriate to involve 'non-traditional' lenders in the loan process, and 3) how can the agency better streamline or simplify the application process. USDA is interested especially in receiving feedback from former applicants regarding the details of the application process. This comment period is the sole opportunity for the public to affect the way the Section 9006 program will be administered in the future. USDA has posted an HTML version of the proposed rule at: <http://www.rurdev.usda.gov/rbs/farmbill/4280proposed.htm>

### **Upcoming Events**

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Further Information</u>
Sept.20-22, 2004	2nd International Ukrainian Conference on Biomass for Energy	Kiev, Ukraine	<a href="http://www.biomass.kiev.ua">http://www.biomass.kiev.ua</a>
Sept. 21-23, 2004	California Independent Oil Marketers Association Pacific Oil Conference	Reno, Nevada	<a href="http://www.ncvecs.colostate.edu">http://www.ncvecs.colostate.edu</a>
Oct. 25-27, 2004	Biofuels Workshop and Trade Show	Sacramento, CA	<a href="http://www.bbibioufuels.com/biofuelsworkshop">http://www.bbibioufuels.com/biofuelsworkshop</a>
Nov. 8, 9, 10, 2004	4th Annual Renewable Energy from Organics Recycling Conference	Des Moines, Iowa	<a href="http://www.jgpress.com/conferences1/conferences1.html">http://www.jgpress.com/conferences1/conferences1.html</a>
Jan. 20-21, 2005	Harvesting Clean Energy V	Great Falls, Montana	<a href="http://www.harvestcleanenergy.org/hce.html">http://www.harvestcleanenergy.org/hce.html</a>
Jan. 23-26, 2005	US Composting 13th Annual Conference & Trade Show	San Antonio, Texas	<a href="http://www.compostingcouncil.org/section.cfm?id=30">http://www.compostingcouncil.org/section.cfm?id=30</a>
Jan. 30-Feb. 2, 2005	National Biodiesel Conference and Expo	Ft. Lauderdale, FL	<a href="http://www.biodiesel.org/expo2005">http://www.biodiesel.org/expo2005</a>
Feb. 7-9, 2005	10th Annual National Ethanol Conference "Homegrown for the Homeland"	Scottsdale, AZ	<a href="http://www.ethanolrfa.org/nec.shtml">http://www.ethanolrfa.org/nec.shtml</a>

### **Notable Quotables**

"Investing in alternative forms of clean-burning energy is good for the environment, good for national security and energy independence, good for job creation and economic development, and good for taxpayers."

Senator Charles Grassley (R-IA) [October 6, 2004]

"We need more traditional energy. We need more renewable energy. We need a profound investment in research to develop new, alternative energies. We need it all yesterday. Let's stop stalling and get this done."

Senator Pete Domenici (R-NM) [July 12, 2004]

"Thoreau gave the definitive reply to the folly of 'significant numbers' a long time ago: Why should anybody wait to do what is right until everybody does it? It is not 'significant' to love your own children or eat your own dinner, either. But normal humans will not wait to love or eat until it is mandated by an act of Congress."

Wendell Berry (Daily Grist 8.6.04)



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